IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Volkert A. Zeijlemaker	Examiner:	Ruth S. Smith
Serial No.	10/673,778	Group Art:	3737
Filing Date:	September, 29 2003	Docket No.:	P0010498.00
		Conf. No.:	2478
Title:	CONTROLLING BLANKING DURING MAGNETIC RESONANCE IMAGING		

APPEAL BRIEF

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P.O. Box 1450
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This is an Appeal from the final Office Action dated February 16, 2010 finally rejecting claims 1, 3–5, 7–12, 15, 17–21, 23–33 and 39–45. The Notice of Appeal was filed on May 14, 2010 along with a Pre-Appeal Brief Request for Review. The Pre-Appeal Brief Conference Decision was received on September 27, 2010.

The required fee of $540 for filing a brief in support of an appeal and a 1-month extension of time will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.16, 1.17, 1.136(a), or any additional fees to Deposit Account 13-2546.

TABLE OF CONTENTS

Page

Real Party in Interest....3

Related Appeals and Interferences....3

Status of Claims....3

Status of Amendments....3

Summary of Claimed Subject Matter....3

Grounds of Rejection to be Reviewed on Appeal....6

Argument....6

Claims Appendix....12

Evidence Appendix....18

Related Proceedings Appendix....19

REAL PARTY IN INTEREST

The real party in interest is Medtronic, Incorporated of Minneapolis, Minnesota.

RELATED APPEALS AND INTEREFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1, 3–5, 7–12, 15, 17–21, 23–33 and 39–45, which are the subject of this Appeal, are pending and stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster et al. (U.S. 6,925,328, hereinafter "Foster") in view of Weisner et al. (U.S. 7,024,249, hereinafter "Weisner"). In the Interview Summary dated September 28, 2010, the Examiner indicated that the Burnes et al. and Ferek-Petric references were disqualified as prior art under 35 U.S.C. § 103(c). Therefore, the § 103 rejections using Burnes et al. and Ferek-Petric as secondary references have been withdrawn, leaving Appellant's claims standing rejected under § 103 over Foster in view of Weisner.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Final Office Action mailed on February 16, 2010, from which this Appeal has been made.

SUMMARY OF CLAIMED SUBJECT MATTER

A concise summary of each of independent claims 1, 11, 23 and 31 is provided below with reference to Appellant's specification as filed.

Claim 1

Claim 1 is directed to a method of coordinating magnetic resonance imaging (MRI) with operation of an implantable medical device (IMD). Claim 1 recites *receiving, via wireless telemetry, a control signal prior to delivery of an electromagnetic radiation burst to a patient in*

whom the IMD is implanted. Appellant's specification, including at least paragraphs [0021], [0030], [0037], and [0038], describes sending a control signal to the IMD or receiving the control signal with the IMD prior to applying the electromagnetic radiation bursts to cause activation of blacking periods.

Claim 1 also recites *responsive to receipt of the control signal by the IMD, blanking one or more components of the IMD for a time period including at least the delivery of the electromagnetic radiation burst to the patient*. Appellant's specification, including at least paragraphs [0021], [0030], [0037], and [0038], describes the IMD receiving the control signal and subsequently initiating a blanking period just prior to the application of the electromagnetic radiation bursts.

Claim 11

Claim 11 is directed to an implantable medical device (IMD). Claim 1 recites that the IMD includes *a receiver to receive, via wireless telemetry, a control signal produced by a magnetic resonance imaging (MRI) system prior to application of an MRI electromagnetic radiation burst*. Appellant's FIG. 2 illustrates a block diagram of an IMD 10 that includes a receiver 32 that facilitates reception of wireless signals 28 from MRI device 20. Appellant's specification, including at least paragraph [0021], [0030], [0037] and [0038], describes MRI device 20 sending a control signal to IMD 10 or IMD 10 receiving the control signal prior to application of the electromagnetic radiation bursts.

Claim 11 also recites that the IMD includes *a control unit that in response to the control signal, blanks one or more components the IMD for a time period including at least the application of an MRI electromagnetic radiation burst delivered by the MRI system*. Appellant's FIG. 2 illustrates a block diagram of an IMD 10 that includes an IMD control unit 38 that coordinates circuitry 36 so that sensing and stimulation occurs at proper times. Appellant's specification, including at least paragraphs [0021], [0030], [0037], and [0038], describes the IMD blanking or being caused to blank one or more components the IMD for a time period including at least the application of an MRI electromagnetic radiation burst delivered by the MRI system in response to the control signal.

Claim 23

Claim 23 is directed to a system. Claim 23 recites that the system includes *a magnetic resonance imaging (MRI) device including a transmitter to transmit, via wireless telemetry, a control signal relating to application of an MRI electromagnetic radiation burst from the MRI device prior to application of the MRI electromagnetic radiation burst*. Appellant's FIG. 2 illustrates a block diagram of a system that includes an MRI device 20 that includes a transmitter 42 to facilitate transmission of wireless signals 28 to IMD 10. Appellant's specification, including at least paragraphs [0021], [0030], [0037], and [0038], describes sending a control signal to the IMD prior to applying the electromagnetic radiation bursts to cause activation of blacking periods.

Claim 23 also recites that the system includes *an implantable medical device (IMD) having a receiver to receive, via wireless telemetry, the control signal produced by the MRI system prior to application of an MRI electromagnetic radiation burst and a control unit responsive to the control signal to blank one or more components of the IMD for a time period including at least the application of the MRI electromagnetic radiation burst*. Appellant's FIG. 2 illustrates a block diagram of an IMD 10 that includes a receiver 32 that facilitates reception of wireless signals 28 from MRI device 20 and an IMD control unit 38 that coordinates circuitry 36 so that sensing and stimulation occurs at proper times. Appellant's specification, including at least paragraph [0021], [0030], [0037] and [0038], describes MRI device 20 sending a control signal to IMD 10 or IMD 10 receiving the control signal prior to application of the electromagnetic radiation bursts. Appellant's specification, including at least paragraphs [0021], [0030], [0037], and [0038], also describes the IMD blanking or being caused to blank one or more components the IMD for a time period including at least the application of an MRI electromagnetic radiation burst delivered by the MRI system in response to the control signal.

Claim 31

Claim 31 is directed to a system including a programmer device, MRI device and IMD. Appellant's FIG. 4 illustrates a system that includes a programmer 60 in conjunction with an MRI device 20 and an IMD 10.

Claim 31 recites the *programmer device defining timing for application of a magnetic resonance imaging (MRI) electromagnetic radiation burst and generating first and second*

signals indicative thereof. Appellant's specification, including at least paragraph [0042], describes programmer 60 defining the timing of MRI radiation bursts. Paragraph [0042] further describes programmer 60 sending first and second signals to IMD 10 and MRI device 20, respectively, that include the defined timing information.

Claim 31 also recites that the *MRI device responsive to the first signal and applying the electromagnetic radiation burst according to the timing indicated by the first signal.* Appellant's specification, including at least paragraph [0042], describes MRI device 20 applying MRI electromagnetic radiation bursts according to timing communicated from programmer 60.

Claim 31 further recites that the *implantable medical device (IMD) to receive the second signal from the programmer and blank one or more components of the IMD for a time period including at least the application of the MRI electromagnetic radiation burst.* Appellant's specification, including at least paragraph [0042], describes IMD 10 initiating blanking periods during application of the radiation bursts by using the timing information communicated from programmer 60.

GROUNDS OF REJECTION TO BE REVIWED ON APPEAL

Claims 1, 3–5, 7–12, 15, 17–21, 23–33 and 39–45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster et al. (U.S. 6,925,328, hereinafter "Foster") in view of Weisner et al. (U.S. 7,024,249). As described above, the § 103 rejections using the Burnes et al. and Ferek-Petric references were withdrawn because the references were disqualified as prior art under 35 U.S.C. § 103(c). As such, the only remaining rejection of Appellant's claims is the § 103 rejection over Foster in view of Weisner.

ARGUMENT

Appellant has separated the claims into groups as set forth below for purposes of argument. In particular, Appellant separately argues 1, 3–5, 7–12, 15, 17–21, 23–30, and 41 as a first group, argues claims 31–33, 39 and 40 as a second group, argues claims 42–44 as a third group and argues claim 45 as a fourth group.

Claims 1, 3–5, 7–12, 15, 17–21, 23–30, and 41

Appellant argues claims 1, 3–5, and 7–10 as a group. Appellant directs the Board to independent claim 1 as the claim representative of the group. Appellant's claim 1 is directed to a method of coordinating magnetic resonance imaging (MRI) with operation of an implantable medical device (IMD). The method includes receiving, via wireless telemetry, a control signal prior to delivery of an electromagnetic radiation burst to a patient in whom the IMD is implanted and responsive to receipt of the control signal by the IMD, blanking one or more components of the IMD for a time period including at least the delivery of the electromagnetic radiation burst to the patient.

In rejecting claim 1, the Office Action indicated that Foster discloses an IMD in combination with an MRI device, whereby some of the components of the IMD are disabled during an MRI scanning session. The Office Action characterized FIG. 5 of Foster as disclosing the MRI device generating signals that are detected by the IMD and the signals are evaluated to determine whether or not to disable portions of the IMD. In the Response to Arguments, the Examiner further clarified her position, indicating:

> "Foster et al clearly disclose that the circuitry of the MR instrumentation activates a trigger voltage. Thereafter (approx. 3 seconds) the circuitry activates transmission of Rf coil pulses. The trigger voltage is used to deactivate the IMD. The trigger voltage causes the parallel resonant circuit to be formed which functions as an open switch at resonant frequencies of the circuit. This is considered to provide a means for blanking the IMD in response to a control signal because the IMD is eventually deactivated as a result of the control signal."

The activation of the trigger voltage is not a control signal received by the IMD prior to delivery of an electromagnetic radiation burst to a patient in whom the IMD is implanted and that causes blanking of one or more components of the IMD responsive to receipt of the control signal. If the trigger voltage is considered to be the control signal (as suggested by the Examiner), the IMD of Foster does not **blank** one or more components of the IMD **responsive to receipt** of the control signal, as recited in Applicant's claim 1.

As described with reference to FIG. 5 of Foster, the trigger voltage simply causes a parallel-resonant circuit to be formed. *Foster, col. 10, lines 15–25.* The parallel resonant circuit does not blank one or more components of the IMD. For example, signals at frequencies away from the resonant frequency of the parallel-resonant circuit are not blocked by the circuit and may still be received by the components of the IMD. As such, the IMD does not **blank** one or more components **responsive to receipt** of the control signal, as required by Applicant's claim 1.

Instead, Foster indicates that parallel-resonant circuit is functional **only** when the resonant condition is met. *Foster, col. 10, lines 15–25.* In other words, to the extent that forming a parallel-resonant circuit may be considered blanking at all, the parallel resonant circuit does not blank the circuitry until a signal at or near the resonant frequency is received, i.e., responsive to the RF pulses of the MRI. This is different than blanking the one or more components responsive to receipt of the control signal, i.e., the trigger voltage in the Examiner's analysis.

Moreover, the signals detected by the IMD in Foster are not control signals received via wireless telemetry. The Office Action acknowledged as much by indicating that Foster does not disclose the use of wireless telemetry to send control signals to the IMD. As mentioned above, however, the Office Action attempts to overcome this deficiency with the teachings of Weisner of the use of control signals to control the IMD through wireless telemetry. For the reasons set forth below, however, there is no rational reason as to why one of ordinary skill in the art would modify the teachings of Foster in view of teachings of Weisner as suggested by the Examiner. In the Response to Arguments, the Examiner dismisses Applicant's arguments by stating that "one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references." Applicant disagrees. Applicant is not attacking the references individually, but is illustrating why one of ordinary skill in the art would have no rational reason to combine the references as suggested by the Examiner.

As acknowledged by the Examiner, Foster does not describe the MRI device communicating with the IMD via wireless telemetry or otherwise intelligibly communicating with the IMD. Weisner describes a programming device, not an MRI device, communicating with the IMD via wireless telemetry. Programming devices primarily operate to configure settings of an IMD or receive sensed data from the IMD. To the contrary, MRI devices operate to generate images of internal structure and function of a body of a patient and are not conventionally configured to perform wireless telemetry communication with an IMD, as required by Applicant's claim 1. As such, there is no rational reason provided as to why one of ordinary skill in the art would modify Foster, which teaches a conventional MRI device that has no mechanism for wireless telemetry with the IMD, to include wireless telemetry between the MRI device and the IMD.

Even if the references were combined as suggested, however, such a modification would still fail to arrive at the features of Applicant's claim 1 for the reasons set forth above with

respect to Foster. In particular, the control signal sent via wireless telemetry would simply cause a parallel-resonant circuit to be formed. The parallel resonant circuit, however, does not function to blank any components until a signal at or near the resonant frequency is received, i.e., responsive to receipt of the RF pulses of the MRI. Therefore, the IMD still would not blank one or more components responsive to receipt of the control signal, as required by Applicant's claim 1.

For at least the reasons above, the claims of this group are not obvious over Foster in view of Weisner.

Claims 31–33, 39 and 40

Appellant argues claims 31–33, 39 and 40 as a group. Appellant directs the Board to independent claim 31 as the claim representative of the group. As discussed above, claim 31 is directed to a system that includes a programmer device, MRI device and an IMD. Claim 31 recites that the programmer defines timing for application of MRI electromagnetic radiation burst and generating first and second signals indicative thereof. Claim 31 also recites that the MRI device is responsive to the first signal and applies the electromagnetic radiation burst according to the timing indicated by the first signal. Claim 31 further recites that the IMD receives the second signal from the programmer and blanks one or more components of the IMD for a time period including at least the application of the MRI electromagnetic radiation burst. In this manner, the programmer device coordinates the MRI device and the IMD based on timing information defined by the programmer device.

As argued in Appellant's Pre-Appeal Brief Request for Review, the Examiner has failed to establish a prima facie case of obviousness with respect to Applicant's independent claim 31. In the final Office Action, the Examiner grouped the rejection of claim 31 with independent claims 1, 11 and 23. However, Applicant's independent claim 31 includes a number of features not recited in Applicant's independent claims 1, 11 and 23. For example, the Examiner has failed to provide a reference or references that disclose a system comprising a programmer device defining timing for application of a magnetic resonance imaging (MRI) electromagnetic radiation burst and generating first and second signals indicative thereof, as recited in Appellant's claim 31. Foster describes an IMD in combination with an MRI device, but does not describe a programming device that defines timing for application of MRI electromagnetic

radiation burst and generating first and second signals indicative of the timing information. Likewise, Weisner fails to disclose a programming device that defines timing for application of MRI electromagnetic radiation burst and generating first and second signals indicative of the timing information. Instead, Weisner describes the general notion of sending signals to control an IMD through wireless telemetry.

The Examiner has failed to provide a reference or references that disclose an MRI device responsive to the first signal and applying the electromagnetic radiation burst according to the timing indicated by the first signal. Neither Foster nor Weisner, alone or in combination, describe an MRI device responsive to the first signal and applying the electromagnetic radiation burst according to the timing indicated by the first signal. Again, the MRI device in Foster does not receive a signal from a programming device indicative of defined timing information. Like most conventional MRI devices, the MRI device presumably defines the timing for application of the MRI radiation burst.

For at least the reasons set forth above, the Examiner has failed to provide a reference to provide a prima facie rejection. Therefore the rejection of claim 31 is erroneous. As such, the claims of this group are not obvious over Foster in view of Weisner.

Claims 42–44

Claims 42–44 is argued separately as a group. Appellant directs the Board to independent claim 42 as the claim representative of the group. Claim 42 recites blanking one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient. Foster fails to disclose or suggest such a feature. Instead, FIG. 5 of Foster describes a parallel resonant circuit that functions as an open switch **only** in response to a signal at or near the resonant frequency of the circuit. *Foster, col. 10, lines 15–25.* In this manner, the parallel resonant circuit only functions as an open switch during actual application of the RF pulses by the MRI device, not **prior to** the delivery of the electromagnetic radiation bursts, as recited in Applicant's claim 42. As such, it is not possible to expand the blanking period as suggested by the Examiner to include a few seconds before the RF pulses are applied. For at least these reasons, the claims of this group are not obvious over Foster in view of Weisner.

Claim 45

Claim 45 is argued separately. Claim 45 recites that the IMD blanks one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient. Foster fails to disclose or suggest such a feature. Instead, FIG. 5 of Foster describes a parallel resonant circuit that functions as an open switch **only** in response to a signal at or near the resonant frequency of the circuit. *Foster, col. 10, lines 15–25.* In this manner, the parallel resonant circuit only functions as an open switch during actual application of the RF pulses by the MRI device, not **prior to** the delivery of the electromagnetic radiation bursts, as recited in Applicant's claim 45. As such, it is not possible to expand the blanking period as suggested by the Examiner to include a few seconds before the RF pulses are applied. For at least these reasons, the claims of this group are not obvious over Foster in view of Weisner.

Conclusion

In view of the above, it is submitted that the Examiner has failed to meet the burden of establishing a prima facie case of anticipation in view of Morgan or a prima facie case of obviousness over Morgan in view of Kruse. In view of Appellant's arguments, the final rejection of Appellant's claims is improper and should be reversed.

Respectfully submitted,

Date: November 29, 2010

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CLAIMS APPENDIX

1. (Previously presented) A method of coordinating magnetic resonance imaging (MRI) with operation of an implantable medical device (IMD), comprising:

receiving, via wireless telemetry, a control signal prior to delivery of an electromagnetic radiation burst to a patient in whom the IMD is implanted; and

responsive to receipt of the control signal by the IMD, blanking one or more components of the IMD for a time period including at least the delivery of the electromagnetic radiation burst to the patient.

2. (Cancelled)

3. (Previously presented) The method of claim 1, wherein receiving the control signal comprises receiving the control signal directly from the MRI device via wireless telemetry.

4. (Previously presented) The method of claim 1, wherein receiving the control signal comprises receiving the control signal from a programmer device via wireless telemetry.

5. (Previously presented) The method of claim 1, wherein the control signal indicates timing information for application of the electromagnetic radiation bursts and blanking the one or more components of the IMD comprises blanking the one or more components consistent with the timing information.

6. (Cancelled)

7. (Previously presented) The method of claim 5, wherein the timing information comprises an indication of a start time of one or more of the electromagnetic radiation bursts.

8. (Previously presented) The method of claim 7, wherein the timing information comprises an indication of a duration of one or more of the electromagnetic radiation bursts.

9. (Previously presented) The method of claim 1, wherein blanking the one or more components of the IMD includes disabling one or more sensing components of the IMD for a period of time and re-enabling the one or more sensing components following the period of time.

10. (Previously presented) The method of claim 9, wherein blanking the one or more components of the IMD includes disabling one or more sensing amplifiers of the IMD for the period of time and enabling the one or more sensing amplifiers following the period of time.

11. (Previously presented) An implantable medical device (IMD) comprising:

a receiver to receive, via wireless telemetry, a control signal produced by a magnetic resonance imaging (MRI) system prior to application of an MRI electromagnetic radiation burst; and

a control unit that in response to the control signal, blanks one or more components the IMD for a time period including at least the application of an MRI electromagnetic radiation burst delivered by the MRI system.

12. (Previously presented) The device of claim 11, wherein the control signal indicates timing information for application of the electromagnetic radiation burst and the control unit blanks the one or more components of the IMD consistent with the timing information.

13. (Cancelled)

14. (Cancelled)

15. (Previously presented) The device of claim 11, wherein the control signal comprises a signal used by the IMD to define blanking duration of the components of the IMD.

16. (Cancelled)

17. (Previously presented) The device of claim 12, wherein the timing information provides an indication of a start time of the MRI electromagnetic radiation burst.

18. (Previously presented) The device of claim 14, wherein the timing information provides an indication of a duration of the MRI electromagnetic radiation burst.

19. (Previously presented) The device of claim 11, wherein the control unit blanks the one or more components of the IMD by disabling one or more sensing components of the IMD for a period of time and enabling the one or more sensing components following the period of time.

20. (Previously presented) The device of claim 19, wherein the control unit blanks the one or more components of the IMD by disabling one or more sensing amplifiers of the IMD for the period of time and enabling the one or more sensing amplifiers following the period of time.

21. (Previously presented) The device of claim 11, wherein the IMD is selected from the group consisting of:

an implantable cardiac pacemaker, an implantable defibrillator, an implantable cardioverter, an implantable pacemaker-defibrillator-cardioverter, an implantable sensing device; an implantable monitor; an implantable muscular stimulator; an implantable nerve stimulator; an implantable deep brain stimulator, an implantable gastric stimulator, an implantable colon stimulator, an implantable agent dispenser, and an implantable recorder.

22. (Cancelled)

23. (Previously presented) A system comprising:

a magnetic resonance imaging (MRI) device including a transmitter to transmit, via wireless telemetry, a control signal relating to application of an MRI electromagnetic radiation burst from the MRI device prior to application of the MRI electromagnetic radiation burst; and

an implantable medical device (IMD) including:

a receiver to receive, via wireless telemetry, the control signal produced by the MRI system prior to application of an MRI electromagnetic radiation burst; and

a control unit responsive to the control signal to blank one or more components of the IMD for a time period including at least the application of the MRI electromagnetic radiation burst.

24. (Previously presented) The system of claim 23, wherein the receiver receives the control signal directly from the MRI device.

25. (Previously presented) The system of claim 23, further comprising a programmer device, wherein the MRI device transmits the control signal to the programmer device, and the receiver of the IMD receives the control signal from the programmer device.

26. (Previously presented) The system of claim 23, wherein the control signal comprises a signal used by the IMD to define blanking of components of the IMD.

27. (Previously presented) The system of claim 23, wherein the control signal provides an indication of a start time of the MRI electromagnetic radiation burst.

28. (Previously presented) The system of claim 23, wherein the control signal provides an indication of a duration of the MRI electromagnetic radiation burst.

29. (Previously presented) The system of claim 23, wherein the control unit blanks the one or more components of the IMD by disabling one or more sensing components of the IMD for a period of time and enables the one or more sensing components following the period of time.

30. (Previously presented) The system of claim 29, wherein the control unit blanks the one or more components of the IMD by disabling one or more sensing amplifiers of the IMD for a period of time and enabling the one or more sensing amplifiers following the period of time.

31. (Previously presented) A system comprising:

a programmer device defining timing for application of a magnetic resonance imaging (MRI) electromagnetic radiation burst and generating first and second signals indicative thereof;

an MRI device responsive to the first signal and applying the electromagnetic radiation burst according to the timing indicated by the first signal; and

an implantable medical device (IMD) to receive the second signal from the programmer and blank one or more components of the IMD for a time period including at least the application of the MRI electromagnetic radiation burst.

32. (Original) The system of claim 31, wherein the first and second signals comprise an indication of a start time of the MRI electromagnetic radiation burst.

33. (Original) The system of claim 31, wherein the first and second signals comprise an indication of a duration of the MRI electromagnetic radiation burst.

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Previously presented) The system of claim 31, wherein the one or more components of the IMD include one or more sensing components, and the IMD disables the one or more sensing components of the IMD for a period of time and enables the one or more sensing components following the period of time.

40. (Previously presented) The system of claim 39, wherein the one or more sensing components comprise one or more sensing amplifiers.

41. (Previously presented) The device of claim 11, wherein the IMD is selected from the group consisting of:

an implantable cardiac pacemaker, an implantable defibrillator, an implantable cardioverter, an implantable pacemaker-defibrillator-cardioverter, an implantable sensing device; an implantable monitor; an implantable muscular stimulator; an implantable nerve stimulator; an implantable deep brain stimulator, an implantable gastric stimulator, an implantable colon stimulator, an implantable agent dispenser, and an implantable recorder.

42. (Previously presented) The method of claim 1, wherein blanking one or more components of the IMD for a time period including at least the delivery of the electromagnetic radiation burst to the patient comprises blanking one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient.

43. (Previously presented) The device of claim 11, wherein the control unit blanks one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient.

44. (Previously presented) The system of claim 23, wherein the control unit blanks one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient.

45. (Previously presented) The system of claim 31, wherein the IMD blanks one or more components of the IMD for a time period beginning prior to and including delivery of the electromagnetic radiation burst to the patient.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None